

WHAT IS CLAIMED IS:

1. An audio system that reproduces contents
information as sound in a vehicle, comprising:

5 of said vehicle; and
a portable audio apparatus carried by a passenger

an audio apparatus mounted in said vehicle,
wherein said portable audio apparatus comprise:
a storage medium for retaining contents
information; and

10 a transmission module for transmitting said
contents information to said audio apparatus at least
by means of radio communication,

wherein said audio apparatus comprises:

15 a reception module for receiving said contents
information from said portable audio apparatus at least
by means of radio communication; and

20 a control unit for reproducing said contents
information received by said reception module and
outputting the reproduced information as sound from a
speaker mounted in said vehicle.

2. The audio system according to claim 1, wherein
said audio apparatus further comprises:

25 an operation switch that allows the passenger of
said vehicle to input an operation of said audio
system; and

an operation signal transmission module for
transmitting an operation signal corresponding to the

operation of said operation switch to said portable
audio apparatus at least by means of radio
communication,

wherein said portable audio apparatus further
5 comprises a CPU for controlling the own operation
according to said operation signal received from said
audio apparatus at least by means of radio
communication.

3. The audio system according to claim 1, wherein at
10 least any one of said audio apparatus and said portable
audio apparatus further comprises a man-machine
interface capable of selecting a communication
execution state in which contents information is
transmitted between both apparatuses or a non-
15 communication execution state in which contents
information is not transmitted.

4. The audio system according to claim 1, wherein at
least said audio apparatus further comprises a display
for visibly displaying the state of communication
20 between said audio apparatus and said portable audio
apparatus.

5. The audio system according to claim 1, wherein
said audio apparatus identifies said portable audio
apparatus that exists in a predetermined radio
25 communication area of said audio apparatus and further
comprises a system construction unit for constructing a

radio communication system made up of the identified portable audio apparatus and said audio apparatus, and

said audio apparatus acquires said contents information from the portable audio apparatus

5 identified by said system construction unit.

6. The audio system according to claim 5, wherein said audio apparatus further comprises a man-machine interface capable of, when a plurality of contents information pieces is received from a plurality of

10 portable audio apparatuses identified by said system construction unit, instructing simultaneous reproduction of the plurality of contents information pieces,

wherein said control unit, when simultaneous reproduction is instructed by said man-machine interface, outputs at least one contents information piece from among the plurality of contents information pieces whose simultaneous reproduction is instructed from said speaker and at the same time remotely

20 controls said plurality of portable audio apparatuses so that the other contents information pieces are reproduced by at least any one of the plurality of portable audio apparatuses identified by said system construction unit.

25 7. The audio system according to claim 5, wherein said reception module can receive contents information

from the plurality of portable audio apparatuses
identified by said system construction unit,

5 said audio apparatus further comprises a man-
machine interface capable of, when a plurality of
contents information pieces is received from the
plurality of portable audio apparatuses identified by
said system construction unit, setting priority of the
plurality of portable audio apparatuses in order to set
the order of reproducing those contents information
10 pieces, and

 said control unit, when the priority is set by
said man-machine interface, sequentially performs
control that contents information received from one
portable audio apparatus is output as sound from the
15 speaker mounted in said vehicle on said identified
plurality of portable audio apparatuses according to
said priority.

8. The audio system according to claim 5, wherein
said system construction unit, for the purpose of
20 identifying said portable audio apparatuses detected in
said vehicle, which is said predetermined radio
communication area, assigns individual identification
addresses and constructs said radio communication
system with all portable audio apparatuses, which have
25 been assigned identification addresses, and said audio
apparatus.

Patent # 4,433,360

9. The audio system according to claim 5, wherein said system construction unit transmits a first radio signal with directivity in said vehicle and identifies said portable audio apparatus that exists in said

5 predetermined radio communication area based on a second radio signal received from said portable audio apparatus according to the transmission of the radio signal.

10. The audio system according to claim 9, wherein said predetermined radio communication area corresponds to a seat position placed in said vehicle.

11. The audio system according to claim 10, wherein said predetermined radio communication area corresponds to a position of the mount of said portable audio
15 apparatus placed in said vehicle.

12. The audio system according to claim 9, wherein said system construction unit sends a first radio signal from a radio antenna installed almost in the center of said vehicle.

20 13. A contents reproduction method of an audio system that reproduces contents information as sound in a vehicle, comprising:

a system constructing step of constructing a communication system constructed of a portable audio
25 apparatus carried by a passenger of said vehicle and an audio apparatus mounted in said vehicle that performs at least radio communication;

a contents information transmitting step of transmitting contents information pre-stored in said portable audio apparatus to said audio apparatus at least by means of radio communication; and

5 a sound reproducing step of receiving and reproducing said contents information sent in said contents information transmitting step by said audio apparatus at least by means of radio communication and outputting the reproduced information as sound from a
10 speaker mounted in said vehicle.

14. The contents reproduction method according to claim 13, further comprising:

an operation inputting step allowing the passenger of said vehicle to input an operation of said audio
15 system;

an operation signal transmitting step of transmitting an operation signal according to the operation input in said operation inputting step to said portable audio apparatus at least by means of
20 radio communication; and

a reproducing step in which said portable audio apparatus reproduces contents information retained in the portable audio apparatus in response to said operation signal received from said audio apparatus at
25 least by means of radio communication.

15. The contents reproduction method according to claim 13, wherein said radio communication system is

constructed in said system constructing step only at the beginning of audio control.

16. The contents reproduction method according to claim 13, wherein said radio communication system is
5 constructed in said system constructing step at predetermined time intervals.

17. The contents reproduction method according to claim 13, wherein in order to identify said portable audio apparatus detected in said vehicle as a
10 predetermined radio communication area, said system constructing step assigns individual identification addresses and constructs said radio communication system with all portable audio apparatuses with the identification addresses assigned and said audio
15 apparatus.

18. An audio apparatus for a vehicle mounted in a vehicle that reproduces contents information as sound in said vehicle, comprising:

a system construction unit for constructing a
20 radio communication system constructed of a portable audio apparatus carried by a passenger of the vehicle and said audio apparatus;

a reception module for receiving said contents information from said portable audio apparatus at least
25 by means of radio communication; and

a control unit for reproducing said contents information received by said reception module and

outputting the reproduced information as sound from a speaker mounted in said vehicle.

19. The audio apparatus for a vehicle according to claim 18, wherein said system construction unit

5 constructs, when a plurality of said portable audio apparatuses is identified, a radio communication system including the plurality of portable audio apparatuses, and

10 said control unit, between said plurality of portable audio apparatuses, transfers contents information retained in a first portable audio apparatus to a second portable audio apparatus via radio communication and controls so that the contents information is reproduced as sound in said second
15 portable audio apparatus.

20. A contents reproduction method of an audio apparatus for a vehicle mounted in said vehicle to reproduce contents information as sound in said vehicle, comprising:

20 a system constructing step of constructing a radio communication system constructed of a portable audio apparatus carried by a passenger of said vehicle and said audio apparatus;

a receiving step of receiving said contents
25 information from said portable audio apparatus at least by means of radio communication; and

a sound reproducing step of reproducing said contents information received in said receiving step and outputting the reproduced information as sound from a speaker mounted in said vehicle.

5 21. The contents reproduction method according to claim 20, wherein, when a plurality of said portable audio apparatuses is identified in said system constructing step, a radio communication system including the plurality of portable audio apparatuses
10 is constructed, and

said sound reproducing step, between said plurality of portable audio apparatuses, transfers contents information retained in a first portable audio apparatus to a second portable audio apparatus via
15 radio communication and controls so that the contents information is reproduced as sound in said second portable audio apparatus.

22. An audio apparatus for a vehicle that reproduces contents information as sound in a vehicle comprising:
20 an audio control unit equipped with a first radio communication apparatus; and

a plurality of speaker units equipped with a second radio communication apparatus,

wherein said first and second radio communication
25 apparatuses can carry out radio communications based on a predetermined radio communication protocol, and

said plurality of speaker units receives a radio signal sent from the first radio communication apparatus of said audio control unit by said second radio communication apparatus and reproduces contents information included in the received radio signal according to characteristic information individually set for each speaker unit.

23. The audio apparatus for a vehicle according to claim 22, wherein said audio control unit can perform a setting by which said plurality of speaker units is divided into a plurality of groups made up of at least one speaker unit and sends a radio signal including contents information differing among the set plurality of groups.

24. The audio apparatus for a vehicle according to claim 23, wherein said plurality of speaker units is provided in accordance with the seats in the vehicle, and

said audio control unit sends to a speaker unit corresponding to a specific seat, a radio signal including contents information different from the contents information of the other speaker units.

25. The audio apparatus for a vehicle according to claim 22, wherein said audio control unit sends a first radio signal including the same contents information to said plurality of speaker units and sends a second

radio signal including said characteristic information to each speaker unit individually, and

said plurality of speaker units applies sound field processing based on individual characteristic information included in said second radio signal to the contents information included in said first radio signal and then outputs the contents information as sound.

26. The audio apparatus for a vehicle according to claim 25, wherein said characteristic information includes information on the locations of all said plurality of speaker units and sound field processing at those locations, and

said plurality of speaker units performs sound field processing taking into account the other units based on said characteristic information prior to outputting sound from the own unit.

27. The audio apparatus for a vehicle according to claim 22, wherein said plurality of speaker units is provided in accordance with the seats in said vehicle, and

said audio control unit controls a speaker unit from among said plurality of speaker units that corresponds to a specific seat so as to be able to reproduce sound with sound volume, sound quality or sound field different from the other speaker units.

28. The audio apparatus for a vehicle according to claim 27, wherein the seats in said vehicle are provided with a detection unit for detecting whether any child seat is attached, and

5 said audio control unit designates a seat where said detection unit has detected the presence of a child seat as said specific seat and controls the speaker unit corresponding to the seat so as to be able to reproduce sound with sound volume, sound quality or
10 sound field different from the other speaker units.

29. The audio apparatus for a vehicle according to claim 22, wherein said audio control unit is a portable terminal.

30. The audio apparatus for a vehicle according to
15 claim 22, wherein said audio control unit sends, when said radio signal is sent, contents information to be sent through the radio signal by dividing the contents information by a predetermined unit amount of information to said plurality of speaker units.

20 31. The audio apparatus for a vehicle according to claim 30, wherein when the contents information divided into said predetermined unit amounts of information received through said radio signal is reproduced, said plurality of speaker units synchronizes the output
25 timing among one another.

32. The audio apparatus for a vehicle according to claim 22, wherein when a plurality of types of radio

signals sent from different sources is received, said plurality of speaker units reproduces contents information included in any one of the radio signals based on preset priority.

5 33. A portable audio apparatus in the vehicle audio system according to claim 22 that comprises a third radio communication apparatus that receives a radio signal sent from the first radio communication apparatus of said audio control unit and can reproduce
10 sound at least through a headphone based on the radio signal received by the radio communication apparatus.

34. A contents reproduction method for an audio apparatus for a vehicle that reproduces contents information as sound in a vehicle, comprising:

15 a system constructing step of constructing a radio communication system made up of an audio control unit and a plurality of speaker units each equipped with a radio communication apparatus that can carry out radio communication based on a predetermined radio
20 communication protocol;

a first step of sending a radio signal including contents information from said audio control unit; and

a second step of receiving said radio signal from said plurality of speaker units and reproducing the
25 contents information included in the received radio signal as sound according to the characteristic information individually set for each speaker unit.

35. The contents reproduction method according to claim 34, wherein said first step divides said plurality of speaker units into a plurality of groups made up of at least one speaker unit and sends a radio
5 signal including contents information differing among those groups from said audio control unit.

36. The contents reproduction method according to claim 34, wherein in said first step, said audio control unit sends a first radio signal including the
10 same contents information to said plurality of speaker units and sends a second radio signal including said characteristic information to each of the speaker units, and

in said second step, said plurality of speaker
15 units applies sound field processing based on the individual characteristic information included in said second radio signal to the contents information included in said first radio signal individually and then outputs the contents information as sound.

20 37. The contents reproduction method according to claim 34, wherein said plurality of speaker units are preset in accordance with the seats in the vehicle, and

said second step controls a speaker unit from among said plurality of speaker units that corresponds
25 to a specific seat by said audio control unit so as to be able to reproduce sound with sound volume, sound

quality or sound field different from the other speaker units.

38. The contents reproduction method according to claim 34, wherein when said radio signal is sent from said audio control unit in said first step, the contents information to be sent through the radio signal is divided by a predetermined unit amount of information and sent to said plurality of speaker units.

39. The contents reproduction method according to claim 34, wherein when said plurality of speaker units receives a plurality of types of radio signals sent from different sources in said second step, contents information included in any one of the radio signals is reproduced based on preset priority.

40. An audio system that reproduces contents information as sound in a vehicle, comprising:

a portable audio apparatus carried by a passenger of said vehicle; and

an audio apparatus mounted in said vehicle,

wherein said portable audio apparatus comprises:

contents information retaining means for retaining contents information; and

transmitting means for transmitting said contents information to said audio apparatus at least by means of radio communication, and

wherein said audio apparatus comprises:

receiving means for receiving said contents
information from said portable audio apparatus at least
by means of radio communication; and

controlling means for reproducing said contents
5 information received by said receiving means and
outputting the reproduced information as sound from a
speaker mounted in said vehicle.

41. An audio apparatus for a vehicle mounted in a
vehicle that reproduces contents information as sound
10 in said vehicle, comprising:

system constructing means for constructing a radio
communication system constructed of a portable audio
apparatus carried by a passenger of the vehicle and
said audio apparatus;

15 receiving means for receiving said contents
information from said portable audio apparatus at least
by means of radio communication; and

controlling means for reproducing said contents
information received by said receiving means and
20 outputting the reproduced information as sound from a
speaker mounted in said vehicle.

42. An audio apparatus for a vehicle that reproduces
contents information as sound in a vehicle, comprising:

audio controlling means equipped with a first
25 radio communication apparatus and a plurality of
speaker units equipped with a second radio
communication apparatus,

wherein said first and second radio communication apparatuses can carry out radio communications based on a predetermined radio communication protocol, and

5 said plurality of speaker units receives a radio signal sent from the first radio communication apparatus of said audio controlling means by said second radio communication apparatus and reproduces contents information included in the received radio signal according to characteristic information
10 individually set for each speaker unit.

43. A computer program product that provides instructions that implement an operation of the audio apparatus for a vehicle according to claim 18.

44. A computer program product that provides
15 instructions that implement an operation of the audio apparatus for a vehicle according to claim 41.

45. A computer program product that provides instructions that implement the contents reproduction method according to claim 20 with an audio apparatus
20 for a vehicle.

46. A computer-readable storage medium that stores a program code that implements an operation of the audio apparatus for a vehicle according to claim 18.

47. A computer-readable storage medium that stores a
25 program code that implements an operation of the audio apparatus for a vehicle according to claim 41.

48. A computer-readable storage medium that stores a program code that implements the contents reproduction method according to claim 20 with an audio apparatus for a vehicle.